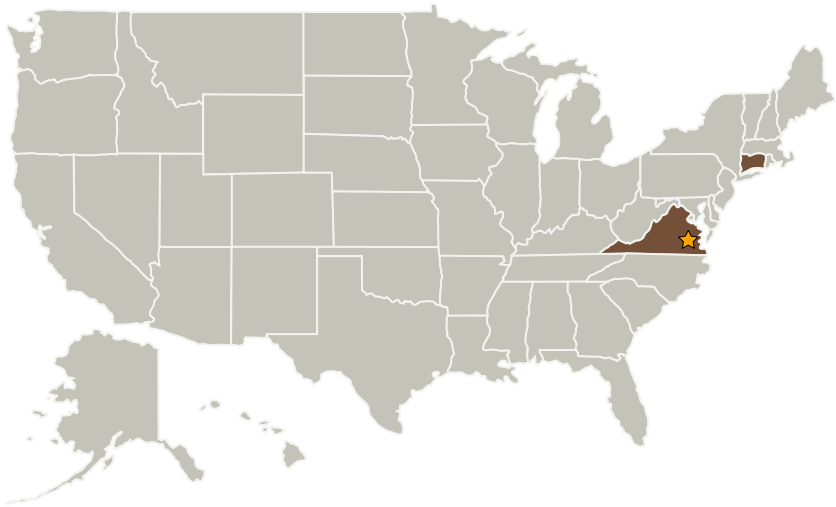
Modeling, Testing and Deploying a Multifunctional Radiation Shielding / Hydrogen Storage Unit, Phase II

Completed Technology Project (2005 - 2008)

Project Introduction

This project addresses two vital problems for long-term space travel activities: radiation shielding and hydrogen storage for power and propulsion. While both problems have been studied for many years, there is currently no satisfactory technology for providing adequate non-parasitic shielding. Even in low-Earth orbit, astronauts must be closely monitored for radiation exposure, and some missions simply cannot be performed due to the current inability to adequately shield astronauts (e.g. Mars or surface Lunar bases). The overall objective of the proposed project is to construct, test, and deliver a prototype for hydrogen storage and radiation shielding. In Phase I we experimentally verified the radiation shielding capability of these systems and its ability to operate after being bombarded by ionizing radiation at a nuclear accelerator. In this Phase II proposal, AFR will join with Boeing to design two multi-layer configurations that could be of use for operational missions. We will then work with Prairie View A&M Univ. to perform an empirical study of radiation shielding using NSRL and Loma Linda particle accelerators. In collaboration with Prof. Larry Townsend, we will perform a complementary computational study to broaden shielding characterization and to validate shielding code performance with respect to this non-parasitic shielding concept. During the process and product assessment, we will coordinate possible commercial ventures with Boeing. The successful operation of the prototype would raise the system's TRL to 5 or 6 (system operated in a relevant environment).

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Advanced Fuel Research, Inc.	Supporting Organization	Industry	East Hartford, Connecticut

Primary U.S. Work Locations	
Connecticut	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.5 Radiation
    - TX06.5.3 Protection Systems